Iron Based Flow Battery

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Electrochemistry:

Positive: $Fe^{+2} \Leftrightarrow Fe^{+3}$ +0.77V

Negative: $Fe^{+2} \Leftrightarrow Fe^{0}$ -0.44V

Cell: $3Fe^{+2} \Leftrightarrow Fe^{0} + 2Fe^{+3}$ 1.21V

Project Goals:

Whr Efficiency:

80% @ 0.1A/cm^2

Cost:

$250/kW, $125/kWh

Advantages:

Low Cost Active Element (Iron)

High Current Density (> 0.1A/cm^2)

Inexpensive Separators

similar electrolyte for positive/negative electrodes

Safety

non-toxic materials, moderate pH

Challenges / Approaches:

Hydrogen Evolution /

Minimized at pH > 3

Coupled Power & Energy /

Fe plating > 200 mAh/cm^2

Fe^{+3} solubility at pH > 2 /

Ligand chemistry